

**AP5291 HARDWARE - SOFTWARE CO-DESIGN**

DETAILED SYLLBUS

**OBJECTIVES:**

- To acquire the knowledge about system specification and modelling.
- To learn the formulation of partitioning
- To study the different technical aspects about prototyping and emulation.

**UNIT I SYSTEM SPECIFICATION AND MODELLING**

Embedded Systems, Hardware/Software Co-Design, Co-Design for System Specification and Modeling, Co-Design for Heterogeneous Implementation - Single-Processor Architectures with one ASIC and many ASICs, Multi-Processor Architectures, Comparison of Co- Design Approaches, Models of Computation, Requirements for Embedded System Specification.

**UNIT II HARDWARE / SOFTWARE PARTITIONING**

The Hardware/Software Partitioning Problem, Hardware-Software Cost Estimation, Generation of the Partitioning Graph, Formulation of the HW/SW Partitioning Problem, Optimization, HW/SW Partitioning based on Heuristic Scheduling, HW/SW Partitioning based on Genetic Algorithms.

**UNIT III HARDWARE / SOFTWARE CO-SYNTHESIS**

The Co-Synthesis Problem, State-Transition Graph, Refinement and Controller Generation, Co Synthesis Algorithm for Distributed System- Case Studies with any one application

**UNIT IV PROTOTYPING AND EMULATION**

Introduction, Prototyping and Emulation Techniques, Prototyping and Emulation Environments, Future Developments in Emulation and Prototyping, Target Architecture-Architecture Specialization Techniques, System Communication Infrastructure, Target Architectures and Application System Classes, Architectures for Control-Dominated Systems, Architectures for Data-Dominated Systems, Mixed Systems and Less Specialized Systems

**UNIT V DESIGN SPECIFICATION AND VERIFICATION**

Concurrency, Coordinating Concurrent Computations, Interfacing Components, Verification, Languages for System-Level Specification and Design System-Level Specification, Design Representation for System Level Synthesis, System Level Specification Languages, Heterogeneous Specification and Multi-Language Co- simulation.

**REFERENCES:**

1. Giovanni De Micheli, Rolf Ernst Morgon, "Reading in Hardware/Software Co-Design" Kaufmann Publishers,2001.
2. Jorgen Staunstrup, Wayne Wolf, "Hardware/Software Co-Design: Principles and Practice" Kluwer Academic Pub,1997.